

Attorney's Docket No.: 07977-023002/US2971/2974/2979D1

REMARKS

Reconsideration of the above-referenced application are respectfully requested.

Upon entry of this amendment, claims 26-30, 32-55, 57-71, 73-76, 78-79, 81-91, 93-99, and 103-106 will remain in the application.

Claim objections

The claims have been amended to obviate the objections to the claims.

Section 112 rejections

Claims 81, 83-85, 87-89, 104, and 105 were rejected under 35 U.S.C. 112, second paragraph, as being allegedly indefinite.

The claims have been amended to obviate the rejections.

Section 102 rejections

Claims 26-30, 32-55, 57-71, 73-76, 78, 79, 81-91, 93-99, and 103-106 were rejected under 35 U.S.C. 102(e) as being allegedly anticipated by JP 8-349735. Applicants note that the correct document number is JP 6-349735, as indicated on the PTO-892 form.

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Claims 26-30, 32-55, 57-71, 73-76, 78, 79, 81-91, 93-99, and 103-106 were rejected under 35 U.S.C. 102(e) as being allegedly anticipated by Zhang et al. (US 5,529,937).

Claims 26-30, 32-55, 57-71, 73-76, 78, 79, 81-91, 93-99, and 103-106 were rejected under 35 U.S.C. 102(e) as being allegedly anticipated by Yamazaki et al. (US 5,789,284).

Independent claims 26, 34, 42, 51, 59, 67, 76, 82, and 86 have been amended to recite that the gettering layer comprises phosphorous.

None of the references appears to disclose using phosphorous as a gettering material.

Independent claims 81, 83-85, and 87-89 have been amended to recite that the gettering material is introduced into a portion of the crystallized semiconductor film.

None of the references appears to disclose introducing the gettering material into a portion of the crystallized semiconductor film.

Furthermore, Applicants submit that claims 32, 39, 48, 57, 64, 73, and 99, as amended, find support in the certified English translation of Japanese priority application No. 7-110121, thereby removing Yamazaki as prior art under 35 U.S.C. 102(e).

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Double patenting rejections

Claims 26-30, 32-55, 57-71, 73-76, 78, 79, 81-91, 93-99, and 103-106 were rejected under the judicially created doctrine of obviousness-type double patenting as being allegedly unpatentable over all of the claims of copending Application nos. 08/831,088 and 09/838,216 (provisionally), and U.S. Patent Nos. 5,529,937, 5,789,284, and 6,071,766.

Applicants submit that none of the above-referenced applications and patents claims that the gettering layer comprises phosphorous or introducing the gettering material into a portion of the crystallized semiconductor film. Accordingly, Applicants submit that the claims should be allowed.

Attached is a marked-up version of the changes being made by the current amendment.

Applicant asks that all claims be allowed.

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Date: SEP 26, 2002

Respectfully submitted,



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Version with markings to show changes madeIn the claims:

Claim 72 has been cancelled.

Claims 26, 32, 34, 39, 42, 48, 51, 57, 59, 64, 67, 73, 76, 81-89, 99, 104, and 105 have been amended as follows:

26. (Amended) A method of manufacturing a device comprising
[the steps of]:

providing a semiconductor film on an insulating surface;

providing said semiconductor film with a catalyst metal-
containing material;

crystallizing said semiconductor film by heating in a way
that causes said catalyst metal to diffuse through the
semiconductor film and function to promote the crystallization
of the semiconductor film;

forming a gettering layer comprising phosphorus over said
semiconductor film after the crystallization; and

heating said semiconductor film and said gettering layer at a
temperature from 500°C to 800°C in order to getter the catalyst
metal in said semiconductor film using said gettering layer.

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32. (Amended) A method according to claim 26 wherein said catalyst metal is selected from the group consisting of Ni, Fe, Co, [Ru, Rh, Pd, Os, Ir,] and Pt[, Cu and Au].

34. (Amended) A method of manufacturing a device comprising [the steps of]:

providing a substantially intrinsic semiconductor film on an insulating surface;

providing said semiconductor film with a catalyst metal-containing material;

crystallizing said semiconductor film by heating in a way that causes said catalyst metal to diffuse through the semiconductor film and function to promote the crystallization of said semiconductor film;

forming a gettering layer comprising phosphorus over said semiconductor film after the crystallization; and

heating said semiconductor film and said gettering layer in order to getter the catalyst metal in said semiconductor film by said gettering layer.

39. (Amended) A method according to claim 34 wherein said catalyst metal is selected from the group consisting of Ni, Fe, Co, [Ru, Rh, Pd, Os, Ir,] and Pt[, Cu and Au].

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42. (Amended) A method of manufacturing a device comprising
[the steps of]:

providing a semiconductor film on an insulating surface;

providing a catalyst metal-containing material on said
semiconductor film;

crystallizing said semiconductor film by heating in a way
that causes said catalyst metal to diffuse through the
semiconductor film and function to promote the crystallization
of said semiconductor film;

forming a gettering layer comprising phosphorus over said
semiconductor film after the crystallization; and

heating said semiconductor film and said gettering layer in a
nitrogen atmosphere in order to getter the catalyst metal
contained in said semiconductor film by said gettering layer.

48. (Amended) A method according to claim 42 wherein said
catalyst metal is selected from the group consisting of Ni, Fe,
Co, [Ru, Rh, Pd, Os, Ir,] and Pt[, Cu and Au].

51. (Amended) A method of manufacturing a device having a
junction, said method comprising [the steps of]:

providing a semiconductor film comprising amorphous silicon
on an insulating surface;

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providing a catalyst metal-containing material on said semiconductor film;

crystallizing said semiconductor film by heating in a way that causes said metal to diffuse through the semiconductor film and to promote the crystallization thereof;

forming a gettering layer comprising phosphorus over said semiconductor film after the crystallization;

heating said semiconductor film and said gettering layer at a temperature from 500°C to 800°C in order to getter the metal included in said semiconductor film by said gettering layer; and

forming a doped semiconductor film on said semiconductor film to form a junction.

57. (Amended) A method according to claim 51 wherein said catalyst metal is selected from the group consisting of Ni, Fe, Co, [Ru, Rh, Pd, Os, Ir,] and Pt[, Cu and Au].

59. (Amended) A method of manufacturing a device having a junction, said method comprising [the steps of]:

providing a substantially intrinsic semiconductor film on an insulating surface;

providing a catalyst metal on said semiconductor film;

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crystallizing said semiconductor film by heating to cause said catalyst metal to diffuse through the semiconductor film and to promote the crystallization of said semiconductor film;

forming a gettering layer comprising phosphorus over said semiconductor film after the crystallization thereof;

heating said semiconductor film and said gettering layer in order to getter the catalyst metal in said semiconductor film by said gettering layer; and

forming a junction using said intrinsic semiconductor film.

64. (Amended) A method according to claim 59 wherein said catalyst metal is selected from the group consisting of Ni, Fe, Co, [Ru, Rh, Pd, Os, Ir,] and Pt[, Cu and Au].

67. (Amended) A method of manufacturing a device having a junction, said method comprising [the steps of]:

providing a semiconductor film comprising amorphous silicon formed on an insulating surface;

providing a catalyst metal-containing material on said semiconductor film;

crystallizing said semiconductor film by heating in a way that causes said catalyst metal to diffuse through the semiconductor film and function to promote the crystallization of said semiconductor film;

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forming a gettering layer comprising phosphorus over said semiconductor film after the crystallization; and

heating said semiconductor film and said gettering layer in a nitrogen atmosphere in order to getter the catalyst metal contained in said semiconductor film by said gettering layer; and

forming a junction on said semiconductor film.

73.(Amended) A method according to claim 67 wherein said catalyst metal is selected from the group consisting of Ni, Fe, Co, [Ru, Rh, Pd, Os, Ir,] and Pt[, Cu and Au].

76.(Amended) A method of manufacturing a device, comprising [the steps of]:

providing a semiconductor film on an insulating surface;

forming a catalyst metal-containing material on said semiconductor film, said catalyst being a material which facilitates crystallization of said semiconductor film, but which when present in a final product of the device degrades operation of the device;

crystallizing said semiconductor film by heating in a way that causes said catalyst metal-containing material to diffuse into at least a part of the semiconductor film, said catalyst

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metal-containing material when so diffused functioning to facilitate said crystallization;

forming a gettering layer comprising phosphorus over said semiconductor film after said crystallization; and

processing said semiconductor film and said gettering layer to remove at least one portion of said catalyst metal in said semiconductor film.

81. (Amended) A method of manufacturing a device comprising [the steps of]:

providing a semiconductor film on an insulating surface;

providing said semiconductor film with a metal-containing material;

crystallizing said semiconductor film by heating in a way that causes said metal to diffuse through the semiconductor film and function to promote the crystallization of the semiconductor film;

introducing a gettering [element] material into a portion of said crystallized semiconductor film;

heating said semiconductor film after introducing said gettering [element] material at a temperature from 500°C to 800°C in order to getter the metal in said semiconductor film; and

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removing said portion after gettering the metal in said semiconductor film.

82. (Amended) A method of manufacturing a device comprising [the steps of]:

providing a semiconductor film doped with boron at a concentration of 0.001-0.1 atm% on an insulating surface;

providing said semiconductor film with a metal-containing material;

crystallizing said semiconductor film by heating in a way that causes said metal to diffuse through the semiconductor film and function to promote the crystallization of said semiconductor film;

forming a gettering layer comprising phosphorus over said semiconductor film after the crystallization; and

heating said semiconductor film and said gettering layer in order to getter the metal in said semiconductor film by said gettering layer.

83. (Amended) A method of manufacturing a device comprising [the steps of]:

providing a substantially intrinsic semiconductor film on an insulating surface;

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providing said semiconductor film with a metal-containing material;

crystallizing said semiconductor film by heating in a way that causes said metal to diffuse through the semiconductor film and function to promote the crystallization of said semiconductor film;

introducing a gettering [element] material into a portion of the crystallized semiconductor film;

heating said semiconductor film after introducing said gettering [element] material in order to getter the metal in said semiconductor film; and

removing said portion after gettering the metal in said semiconductor film.

84. (Amended) A method of manufacturing a device comprising [the steps of]:

providing a semiconductor film doped with boron at a concentration of 0.001-0.1 atm% on an insulating surface;

providing said semiconductor film with a metal-containing material;

crystallizing said semiconductor film by heating in a way that causes said metal to diffuse through the semiconductor film and function to promote the crystallization of said semiconductor film;

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introducing a gettering [element] material into a portion of the crystallized semiconductor film;

heating said semiconductor film after introducing said gettering [element] material in order to getter the metal in said semiconductor film; and

removing said portion after gettering the metal in said semiconductor film.

85. (Amended) A method of manufacturing a device comprising [the steps of]:

providing a semiconductor film on an insulating surface;

providing a metal-containing material on said semiconductor film;

crystallizing said semiconductor film by heating in a way that causes said metal to diffuse through the semiconductor film and function to promote the crystallization of said semiconductor film;

introducing a gettering [element] material into a portion of the crystallized semiconductor film;

heating said semiconductor film in a nitrogen atmosphere after introducing said gettering [element] material in order to getter the metal contained in said semiconductor film; and

removing said portion after gettering the metal in said semiconductor film.

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86. (Amended) A method of manufacturing a device having a junction, said method comprising [the steps of]:

providing a semiconductor film doped with boron at a concentration of 0.001-0.1 atm% on an insulating surface;

providing a metal on said semiconductor film;

crystallizing said semiconductor film by heating to cause said metal to diffuse through the semiconductor film and to promote the crystallization of said semiconductor film;

forming a gettering layer comprising phosphorus over said semiconductor film after the crystallization thereof;

heating said semiconductor film and said gettering layer in order to getter the metal in said semiconductor film by said gettering layer; and

forming a junction using an intrinsic semiconductor film.

87. (Amended) A method of manufacturing a device having a junction, said method comprising [the steps of]:

providing a substantially intrinsic semiconductor film on an insulating surface;

providing a metal on said semiconductor film;

crystallizing said semiconductor film by heating to cause said metal to diffuse through the semiconductor film and to promote the crystallization of said semiconductor film;

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introducing a gettering [element] material into a portion of the crystallized semiconductor film;

heating said semiconductor film after introducing said gettering [element] material in order to getter the metal in said semiconductor film by said phosphorus;

removing said portion after gettering the metal in said semiconductor film; and

forming a junction using a doped semiconductor film.

88. (Amended) A method of manufacturing a device having a junction, said method comprising [the steps of]:

providing a semiconductor film doped with boron at a concentration of 0.001-0.1 atm% on an insulating surface;

providing a metal on said semiconductor film;

crystallizing said semiconductor film by heating to cause said metal to diffuse through the semiconductor film and to promote the crystallization of said semiconductor film;

introducing a gettering [element] material into a portion of the crystallized semiconductor film;

heating said semiconductor film and said gettering [element] material in order to getter the metal in said semiconductor film;

removing said portion after gettering the metal in said semiconductor film; and

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forming a junction using an intrinsic semiconductor film.

89. (Amended) A method of manufacturing a device comprising
[the steps of]:

providing a semiconductor film on an insulating surface;

forming a metal-containing material on said semiconductor
film, said metal being a material which facilitates
crystallization of said semiconductor film, but which when
present in a final product of the device degrades operation of
the device;

crystallizing said semiconductor film by heating in a way
that causes said metal-containing material to diffuse into at
least a part of the semiconductor film, said metal-containing
material when so diffused functioning to facilitate said
crystallization;

introducing a gettering [element] material into a portion of
the crystallized semiconductor film;

processing said semiconductor film after introducing said
gettering [element] material to remove at least one portion of
said metal in said semiconductor film; and

removing said portion of the crystallized semiconductor film
after gettering the metal in said semiconductor film.

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99. (Amended) A method according to any one of claims 81-89 wherein said metal is selected from the group consisting of Ni, Fe, Co, [Ru, Rh, Pd, Os, Ir,] and Pt [, Cu and Au].

104. (Amended) A method according to any one of claims 81, 83-85, or 87-89, wherein said gettering [element] material comprises phosphorus.

105. (Amended) A method according to any one of claims 81, 83-85, or 87-89, wherein said gettering [element] material is introduced by a plasma doping method.